

CYTOGENETIC STUDY OF EMBRYOS IN GEESE OF PRESERVABLE STOCK

ESTUDIO CITOGÉNICO DE EMBRIONES DE GANSOS EN GRUPOS DE RESERVA

Jaszczak, K.¹, A. Rabsztyn² and J. Jaszczak¹

¹Institute of Genetics and Animal Breeding, Polish Academy of Sciences, Jastrzebiec, 05-551 Mroków, Poland.

²Agricultural University, Institute of Animal Breeding, Poultry Unit, St. Mickiewicza 24/28, 30-059 Kraków, Poland.

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Palabras clave adicionales

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SUMMARY

A stock of the Polish native breed named Zatorska goose was used for karyotype analysis and study of chromosome abnormalities in early embryos (18-20 h).

This breed was established from crossing four native varieties originated from *Anser anser* (Pomeranian, Suvalska, Podkarpacka) and *Anser cygnoides* (Garbonosa).

Since 1961 these geese have been maintained in closed stock and selected for high egg production and low percentage of fat in carcass.

In all 524 eggs incubated 265 were fertile (50.5 p. cent). Slides with well spread metaphase were obtained from 243 embryos.

Among these embryos only 11 with chromosome abnormalities (4.5 p. cent) were identified. They included haploids (4 embryos), haploid/diploid/triploid chimera (1), trisomics (2), triploid (1) and diploid/tetraploid mosaics (3).

Pure haploidy and mosaicism were the most frequently identified abnormalities. Furthermore 8 embryos (3.29 p. cent) were found to carry the metacentric chromosome 4 of *Anser cygnoides* type in heterozygous condition.

RESUMEN

Se utilizó una raza autóctona polaca denominada ganso Zatorska para análisis cariotípicos y estudio de anomalías cromosómicas en embriones tempranos (18-20 horas). Esta raza se estableció a partir del cruzamiento de 4 variedades autóctonas originadas a partir de *Anser anser* (Pomeranian, Suvalska, Podkarpacka) y *Anser cygnoides* (Garbonosa).

Desde 1961, estos gansos han sido mantenidos en grupos cerrados y seleccionados para alta producción de huevos y bajo porcentaje de grasa en la canal. En un total de 524 huevos incubados, 265 fueron fértiles (50,5 p. cien).

Se obtuvieron portas con metafases de buena calidad a partir de 243 embriones. Entre estos embriones solamente fueron identificados 11 con anomalías cromosómicas (4,5 p. cien). Entre ellos se encontraban haploides (4 embriones), quimeras haploide/diploide/triploide (1), trisómicos (2), triploides (1) y mosaicos diploide/tetraploide (3). La haploidía pura y el mosaicismo fueron las anomalías más frecuentemente identificadas. Además se encontraron 8 embriones (3,29 p. cien) portadores del cromosoma 4 metacéntrico del tipo *Anser cygnoides* en condición heterocigota.

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Table I. Chromosome complements of the various types of abnormalities in early geese embryos. (Complementos cromosómicos de varios tipos de anomalías en embriones tempranos de ganso).

Abnormality	Sex chromosomes (number observed)	Total
Haploid		
1A	Z (4)	4
Haploid/euploid		
1A/2A	Z/ZZ (1) Z/ZW (1)	3
1A/2A/3A	Z/ZZ/ZZZ (1)	
Diploid/polyploid		
2A/4A	ZZ/ZZZZ (1) ZW/ZZWW(2)	3
Triploid		
3A	ZZZ (1)	1
Aneuploid		
2A	ZW + 2 (1) ZZ + 3 (1)	2
Chromosome abnormalities ¹		13 (4.9)
Number analysed		263

¹Number (p. cent)

INTRODUCTION

The analysis of chromosome complements of early chicken embryos has revealed that in domestic fowl various types of chromosome abnormalities can occur including haploids, haploid-euploid chimeras, polyploids and aneuploids (Bloom, 1972, 1974; Fechheimer, 1981). Many of these abnormalities cause physical defects and led to high mortality. The level of spontaneous chromosome aberrations in chicken varies depending upon the strain, line or direction of selection (Snyder, 1975, Reddy and Siegel, 1977, Thorne *et al.*, 1991, Jaszczak and Jaszczak, 1992).

The most of this kind of study concern still chicken and sporadic quails. Therefore this study attempted to deter-

mine extent of chromosome abnormalities in early geese embryos.

MATERIALS AND METHODS

A stock of the Polish native breed named Zatorska goose was used for karyotype analysis and study of chromosome abnormalities in early embryos (18-20 h). This breed was established from crossing four native varieties originated from *Anser anser* (Pomeranien, Suvalska, Podkarpacka) and *Anser cygnoides* (Garbonosa). Since 1961 year these geese have been maintained in closed stock and selected for high eggs production and low percentage of fat in carcass. Eggs were collected and stored at 12°C for 2 weeks.

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Chromosome preparations were made according to the method of Zartman and Jaszczak (1979). After 18-20 h of eggs incubation at 40°C germinal discs were isolated and incubated in RPMI-1640 culture medium with colchicine for a second time for 2 h. at the same temperature. Hypotonic treatment, fixative and spreading followed standard methods. Analysis was limited to the five largest pairs of autosomes with 10 to 20 metaphase spreads for each embryo.

RESULTS

In all 564 eggs incubated 305 were fertile (54.0 p. cent). Slides with well

spread metaphase obtained from 263 embryos. Among these embryos only 13 with chromosome abnormalities (4.9 p. cent) were identified (**table I**). They included haploids (4 embryos), haploid/diploid (2), haploid/diploid/triploid chimera (1), trisomics (2), triploid (1) and diploid/tetraploid mosaics (3). Pure haploidy, chimeras and mosaics were the most frequently identified abnormalities. Furthermore 10 embryos (3.8 p. cent) were found to carry the metacentric chromosome 4 of *Anser cygnoides* type in heterozygous conditions.

It may be concluded that goose embryos have generally had a low incidence of chromosome abnormalities in comparison to some lines or strains of chicken.

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